

REMARKS

Claims 1-11 and 13-16 are pending in the application. By virtue of this response, claims 1 and 15 have been amended without prejudice or disclaimer of any previously claimed subject matter; claims 2, 13, and 14 have been cancelled; and claim 17 has been added. Support for the amendments may be found in the claims as originally filed and throughout the present application. Accordingly, claims 1, 3-11 and 15-17 are currently under consideration. Amendment of certain claims is not to be construed as a dedication to the public of any of the subject matter of the claims as previously presented.

I. Claims Rejected under 35 USC §103

A. Claims 1-4, 6-11, 16 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,242,761 to Fujimoto et al. in view of U.S. Patent No. 6,130,446 to Takeuchi et al.

Claim 1 has been amended to recite a gallium nitride compound semiconductor light-emitting diode wherein “the p-type transmissive electrode and the n-type transmissive electrode transmit light which is generated in the active layer and reflected from the substrate so that the light exits the light emission device.” Applicants note that the amendment includes features of claim 2; accordingly, no new matter has been added by the amendment. A device as recited by claim 1 is not disclosed or suggested by Fujimoto or Takeuchi alone or in combination.

An advantage of the recited features of claim 1 includes that light reflected from the substrate is not shielded by the n-type electrode, which leads to an increase in emitted light from the device, for example, as described on page 16, line 18 to page 17, line 8 of the present specification.

The Examiner, in rejecting pending claim 2 (incorporated into amended claim 1), contends that this feature is taught by Fujimoto in Figure 1, stating “the n-type transmissive electrode 130 transmit light, which is generated in the active layer 107 and reflected from the

substrate so that light exits the light emission device, fig. 1.” (Office Action dated 11/19/2003, page 3, lines 20-22). Applicants respectively disagree with the Examiner. Specifically, Applicants note that the substrates of both Fujimoto and Takeuchi are sapphire substrates (Fujimoto, column 4, line 66 and Takeuchi, Figures 4A-4E). It is well known in the art that sapphire substrates are used, at least in part, because they are transmissive and are transparent to the emission of light (see, for example, Tamaki, column 1, lines 59-61). Thus, the sapphire substrate disclosed in Fujimoto and Takeuchi act as emission surfaces and do not reflect light. Accordingly, Fujimoto and Takeuchi, alone or in combination, do not disclose or suggest that light is reflected from the substrate and exits the emission device as recited in amended claim 1.

Furthermore, the n-type electrode (5) of Takeuchi is completely covered by the n-type electrode pad (8), see for example Figure 4E. Regardless of the light transmitting properties of the n-type electrode, the n-type electrode pad 8 is clearly not transmissive to light (see, for example, column 8, lines 22-26 of Takeuchi describing the composition of the pad electrodes). Fujimoto does not make up for this deficiency. Figure 7 of Fujimoto clearly shows that both the n-type electrode and the p-type electrode are completely covered by electrode pads. Therefore, neither Takeuchi nor Fujimoto (alone or in combination) disclose or suggest that n-type and p-type electrodes are transmissive so that light exits the light emission device, because light is not transmitted through the electrode pads which cover at least one of the electrodes in Takeuchi and both electrodes in Fujimoto.

Accordingly, at the time of the present invention one skilled in the art would not have been motivated to make the considerable modifications to Fujimoto and Takeuchi to arrive at the claimed invention. Furthermore, there is no motivation to make such modifications because non-transmissive portions on the opposite side to the substrate would be expected to result in a reduction in light emission.

Therefore, for at least these reasons, amended claim 1 is novel and unobvious over the cited references, and the rejection should be withdrawn. Additionally, claims 2-4, 6-11, and 16 depend from claim 1 and are allowable for at least similar reasons as claim 1.

B. Claim 13 stands rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,739,554 to Edmond et al. in view of U.S. Patent No. 6,130,446 to Takeuchi et al.

Claim 13 has been cancelled; accordingly, the rejection is now moot.

C. Claim 5 stands rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,242,761 to Fujimoto et al. and U.S. Patent No. 6,130,446 to Takeuchi et al., and further in view of U.S. Patent No. 5,369,289 to Tamaki et al.

Applicants submit that the combination of Fujimoto, Takeuchi, and Tamaki do not disclose or suggest a device wherein “the n-type transmissive electrode is formed on a side face of the substrate, a side face of the buffer layer, and a side face of the n-type gallium nitride compound semiconductor layer in a region neighboring the buffer layer,” as recited by claim 5.

The Examiner states that Tamaki discloses an “n-type transmissive electrode 8 [] formed on a side of the substrate 1.” (Office Action date 11/19/2003, paragraph 5). Applicants respectfully disagree. Tamaki discloses that “an Al layer which is the lower-most layer of the second electrode 8 may be provided as a reflection layer.” (Col. 7, lines 9-12; emphasis added). Thus, the n-type electrode 8 of Tamaki is reflective and not transmissive. Further, there is no disclosure or suggestion that the n-type electrode 8 of Tamaki is substantially transparent with respect to light, i.e., it is not “transmissive,” as recited in the present claims. Thus, the Examiner's asserted motivation to combine the references relies on providing an Al reflection layer as part of the electrode. Such a disclosure by Tamaki, however, fails to provide a motivation to combine the reference teaching to meet the features of the present claim including a transmissive n-type electrode. Further, the combination proposed by the examiner would include a reflective n-type electrode and not a transmissive n-type electrode, as recited in claim 5. Accordingly, the combination of Tamaki with the teachings of Fujimoto and Takeuchi do not achieve the advantage

of improved light emission efficiency by using a reflective n-type electrode (i.e., the motivation to combine cited by the Examiner), and meet the claimed transmissive electrode of claim 5.

For at least the above described reason the features of claim 5 are not disclosed nor suggested by Tamaki, Takeuchi, and Fujimoto, either separately or in combination. Furthermore, the deficiencies of these references are not made up for by any of the references cited by the Examiner, nor are the alleged to. Accordingly, the rejection should be withdrawn.

D. Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over by US 5739554 to Edmond et al. in view of US 5977565 to Ishikawa et al. and US 6130446 to Takeuchi et al.

Claim 14 has been cancelled; accordingly, the rejection to claim 14 is now moot.

Claim 15 has been amended to recite a gallium nitride compound semiconductor light-emitting diode wherein "the p-type transmissive electrode and the n-type transmissive electrode transmit light which is generated in the active layer and reflected from the substrate so that the light exits the light emission device." The recited features are similar to the features of cancelled claim 2 included in claim 1 and discussed above. Thus, for at least similar reasons as discussed above regarding claim 1, independent claim 15 is allowable over the cited references. The additional references cited against claim 15 do not cure the deficiencies of the rejection to claim 1 with respect to the recited features, nor are they alleged to.

CONCLUSION

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue. If it is determined that a telephone conference would expedite the prosecution of this application, the Examiner is invited to telephone the undersigned at the number given below.

In the event the U.S. Patent and Trademark office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to Deposit Account No. 03-1952 referencing docket no. 299002051900. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

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Respectfully submitted,

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